Oil Content Meter

Model GQS-206

Conforming with IMO MEPC.107(49)

15 ppm Bilge Alarm

User's Manual

Supplied by

CXIM

(China Xiamen Instruments & Meters)

IMPORTANT

a) This device should be installed and operated in strict accordance with the instructions in the manual. Failure to do so may cause the manufacturer to refuse maintenance.
b) Installation and servicing should be performed by a qualified and competent technician.
c) This device should be grounded according to the relevant requirements.
d) Before maintaining this device, make sure the power supply has been disconnected.
e) In frigid weather (with an ambient temperature below +1°C), when this device is not in use or is in storage, make sure the metering chamber does not contain any water, in order to prevent the glass pipe from cracking.

① After installation, when this device is not in use, switch off the inlet of clean water and water sample and drain residual water sample in the metering chamber.

② Turn the flow regulator counterclockwise until it will not come off.

English Version

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I. Introduction

The GQS-206 oil content meter is specifically designed for 15 ppm oil water separators according to the IMO resolution. It incorporates infrared metering technologies and advanced micro processing technologies. In general, it should be used in conjunction with an oil water separator.

This device has received a type approval from China Classification Society and its technical performance comply with the requirements set forth in Part 2 "Test and Performance Specifications for Type Approval of 115 Bilge Alarms" and Part 3 "Specifications for Environmental Testing for Type Approval of Pollution Prevention Equipment" in the Revised Guidelines and Specifications for Pollution Prevention Equipment for Machinery Space Bilges of Ships in IMO Resolution (49) (adopted on July 18, 2003). The device features a sound and solid structure with a protection class of IP65, and works efficiently in bilges of ships and various other environments.

II. Technical Specifications

Metering Range: 0-30 ppm

Metering Accuracy: 15±5 ppm (as per IMP MEPC.107 (49))

Response Time: ≤5 seconds

Display: Large-Screen LCD

Power: 110V/220V 50Hz~60Hz

Power Consumption: About 15VA

Alarm Point: 1-15 ppm (adjustable by user as necessary)

Relay Load Capacity:

Maximum Switching Voltage: 250VAC/30VDC;

Maximum Switching Current: 3A

Delay Time of Alarm Point 1: 1-10 seconds

Delay Time of Alarm Point 2: 1-240 seconds

Sample Water Pressure: 0.01-0.8 MPa

Sample Flow Rate: 0.1-4 L/min.

Operating Temperature: 1-55°C

Sway: 22.5°

Enclosure Rating: IP65

Dimensions: 360mm×260mm×150mm

Weight: About 9 kg

III. Metering Principle

Bilge water flows through a metering chamber equipped with a group of photoelectric sensors. The photoelectric sensors measure the signals of the effluent in relation to the transmission light and diffusion light of the infrared signals, and the signals are collected and processed by a microprocessor, thereby enabling the oil content in the effluent to be determined. The measurement is then transmitted to the main controller via related communications protocols, and displayed on the LCD panel. If the oil concentration in the effluent exceeds the set alarm point (defaulted by the system at 15 ppm), Alarm Point 1 Light will flash within the set delay time; at the same time, the corresponding relay will act, and the bilge electromagnetic valve will be shut, thus preventing the overboard discharge of nonconforming effluent.

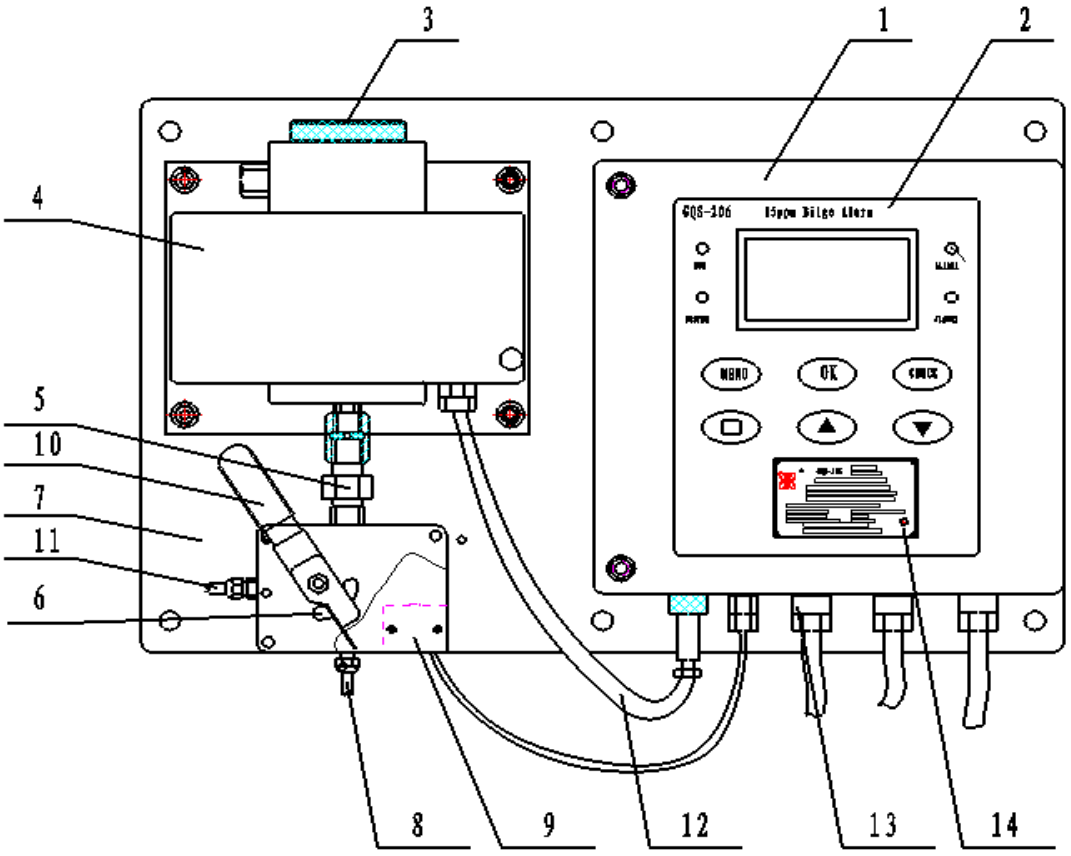
The oil content meter contains two separate circulating alarm points, both of which can be independently set in the range of 1 to 15 ppm. Pursuant to MEPC regulations, both alarm points are factory set at 15 ppm. Alarm point setting can be changed to fit user needs; for example, at 10 ppm or 5 ppm. The alarm point cannot be set above 15 ppm.

As required by Resolution MEPC 107 (49), to avoid willful manipulation, the 15 ppm Bilge Alarm is equipped with a protective device (when the main unit is opened, an alarm will be automatically given, and the water sample will return to the bilge). The device has a seal inside to prevent willful dissembling.

When oily water is properly running through the device, the "Status" on the screen will show "OK". When fresh water is running through or the door of the main unit is opened, the "Status" will show "FW". When the device is disconnected from power, malfunctions (the system light will flash), being cleaned or disconnected from water, the alarm light will flash and the water sample can only flow back to the bilge.

The 15 ppm Bilge Alarm can record date, time and alarm status and operating status of the 15 ppm Bilge Separator. The recording device can store data for 18 months and such data can be accessed. When the 15 ppm Bilge Alarm is replaced, the data recorded remain available on board for 18 months.

IV. Structural Diagram



1	Main Unit	8	1/4" Ferrule-Type Pipe Joint (oily water inlet)
2	Control Panel	9	Proximity Switch
3	Flow Regulator	10	Valve
4	Metering Chamber	11	1/4" Ferrule-Type Pipe Joint (fresh water inlet)
5	Pipe Joint	12	Communication Cable
6	Ball Valve	13	Cable Joint
7	Mounting Plate	14	Nameplate

V. Installation

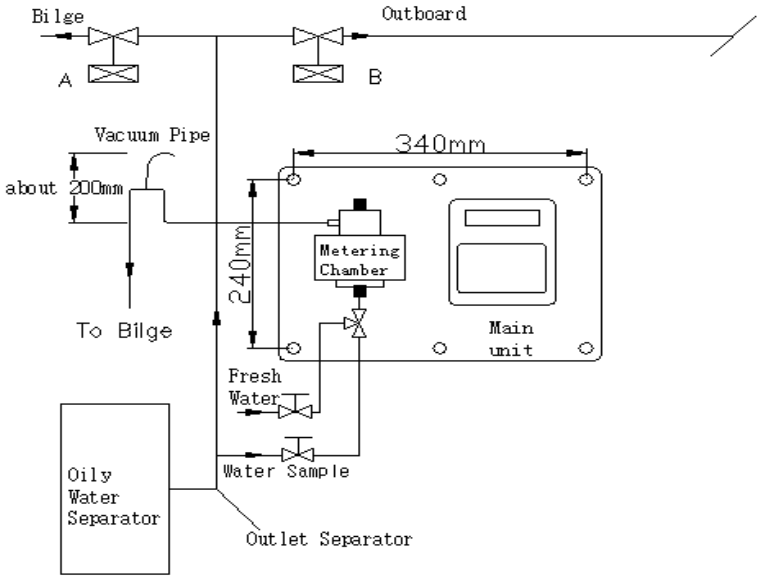
The GQS-206 Bilge Alarm is a non-explosion-proof device.

The GQS-206 Bilge Alarm should be installed as close as practical to the oil water separator to minimize the delay of system response. Installation and connection should be performed according to the following instructions:

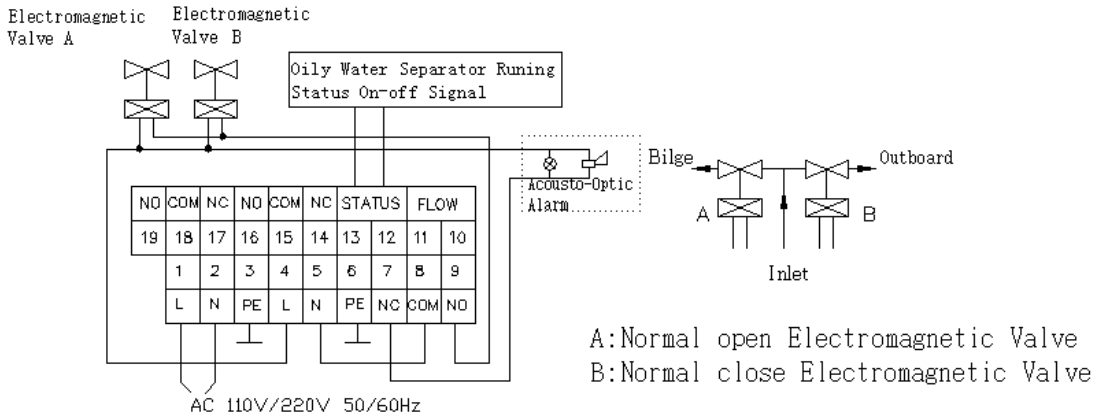
1. Use four M8 screws to mount the GQS-206 Oil Content Meter on a rigid plane and the screen the monitor should preferably be on the eye level. In order to facilitate maintenance and servicing, adequate clearance should be allowed around the equipment when the installation is performed.

2. Φ8mm copper pipe or stainless steel pipe is recommended for the pipe connection between the GQS-206 Oil Content Meter and the outlet of the oil water separator. A sampling point should be provided in a vertical section of the water effluent piping of the separator to reduce the influence of any entrained air. The water outlet should be on the horizontal plane of the monitor outlet to ensure that the metering chamber is full of water at all times.

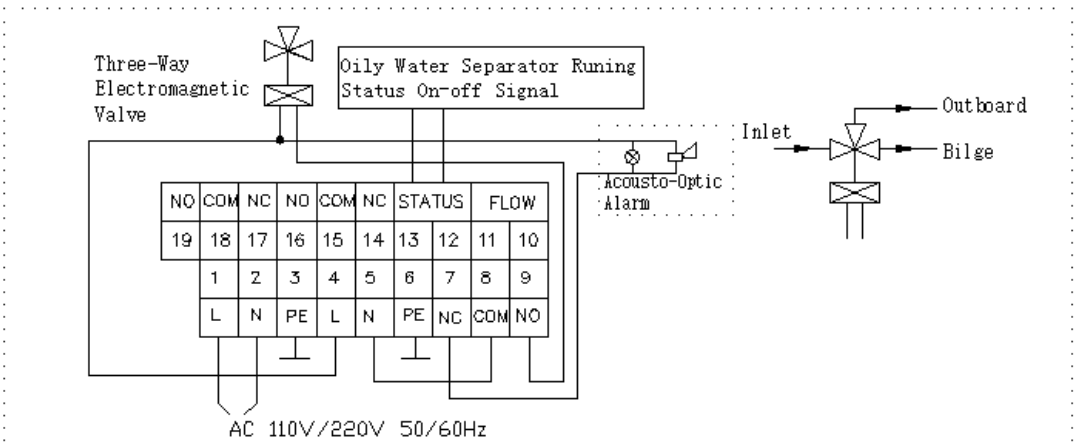
3. Pipe connection and electric diagram



Pipe Installation Diagram (device mounting dimensions 340mm X 240mm)



Electric Connection Diagram(a)



Electric Connection Diagram(b)

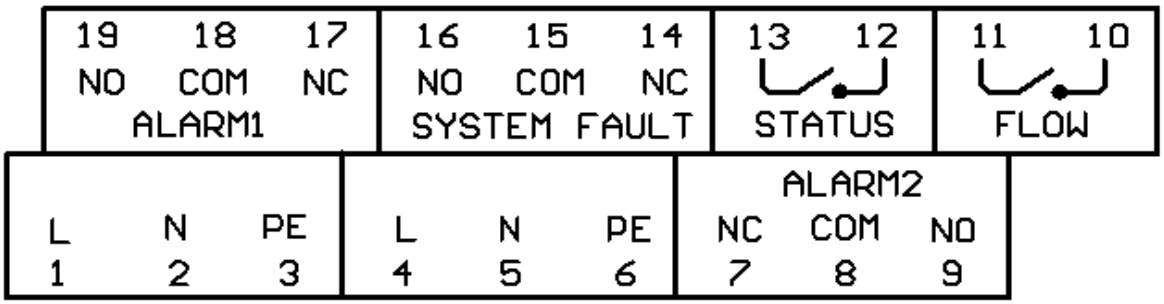
Diagram of Wiring Using Three-Way Electromagnetic Valve

Special Notice:

1. When the device is in an alarm state (fault, power failure or clean water running through): NO – disconnected, NC – Connected;
2. When the device is in a non-alarm state: NO – Connected; NC-Disconnected.

VI. Installation and Connection Diagram

1. Before installation, check the device for any sign of moisture or mechanical damage.
2. Open the main unit, perform connection according to the labeling of the wiring board in the unit case, and make sure that the device has reliable grounding, as shown below.



(1). 1-2: Power Supply (110V/220V 50/60Hz)
(2). 3:6: Grounding
(3). 4-5: Power Output (110V/220V 50/60Hz)
(4). 7-8-9: Alarm Point 2 output (a group of normally-opened and normally-closed relays, typically used for controlling external electromagnetic valve, pump, etc.)
(5). 10-11: Fresh water cleaning valve signal input
(6). 12-13: oil water separator operating status switch input
(7). 14-15-16: System fault alarm output (a group of normally-opened and normally-closed relays which act when the system malfunctions)
(8). 17-18-19: Alarm Point 1 (a group of normally-opened and normally-closed relays, used to control electromagnetic valves and acousto-optic alarms)

Relay's Loading Power:
The most switch Voltage:250VAC/30VDC
The most switch Current:3A

When the oil content exceeds the set value of Alarm Point 1 (defaulted at 15ppm) and the device continuously alarms for excessive oil content at the set delay time (defaulted at 10 seconds), Alarm 1 Light will flash, and System Alarm Relay 1 will act. If, at this point, the oil content of the oily water exceeds the set value of Alarm Point 2 (defaulted at 15ppm) and the device continuously alarms for excessive oil content at the set delay time (defaulted at 240 seconds), Alarm 2 Light will flash and Alarm Relay 2 will act. To prevent mishandling, within the set time of Alarm Point 2, if the oily water does not exceed the set valve of Alarm Point 2, the alarm light will go off and the corresponding relay will act. To adjust the set valve

of the alarm point of the device, users are recommended to set Alarm Point 2 at a level below the set value of Alarm Point 1.

VII. Test Run

After the installation of the device has been completed, perform the following inspection and testing:

1. Electrical Inspection
   Check if electrical connection is correct.

2. Pipe Inspection
   (1) Connect fresh water;
   (2) Set the three-way ball valve to the fresh water position;
   (3) Check all pipe joints for possible leakage.

3. Functional Testing
   (1) Switch on the power, and the power indicator light on the device will flash; normal fresh water connection will be indicated as follows (Fig. 1):

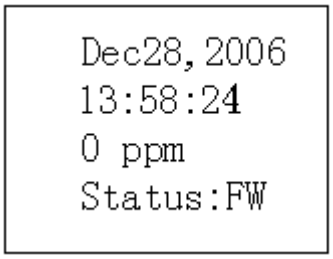


Fig. 1

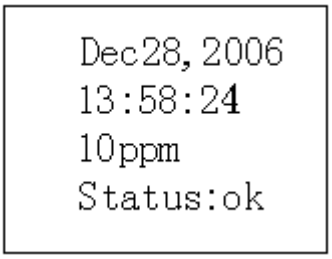


Fig. 2

   (2) Feed the device with water and regulate the flow rate; at this point, the device should show a reading between 0 and 2 ppm; otherwise, the metering chamber should be cleaned or zero point adjustment should be made. For details, see "Maintenance and Servicing". If the device cannot be zeroed, continue feeding the device with water to flush it (normally not more than 15 minutes) until it can be automatically zeroed. If the device still cannot be zeroed, perform zero point adjustment.

   (3) After the testing with fresh water, switch to oily water. A properly operating device will indicate as above (Fig. 2).

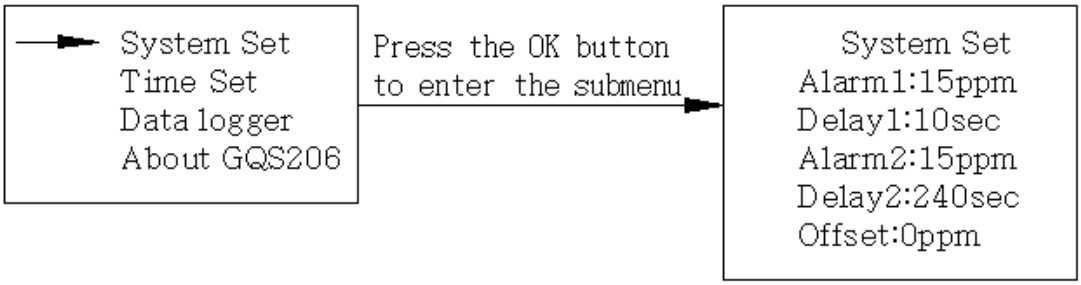
4. Button Control

Panel Control Buttons

There are six buttons on the panel for the user to control the system. "MENU" is the tool button. "OK" is the confirming button. "■" is the system resetting button. "CHECK" is intended for checking the operating status of the lights and the working condition of the relays; when this button is pressed, the lights for ALARM 1 and ALARM 2 will flash and the monitor will display 15ppm. "▲"and "▼" are the buttons for selecting menu direction and size.

(1) System Setup

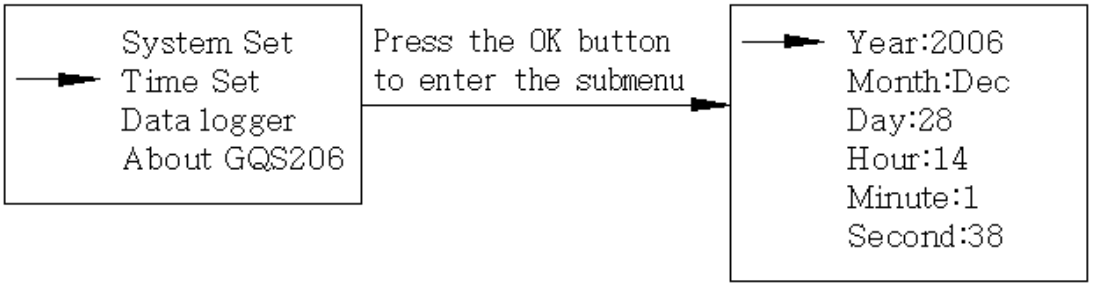
Press the tool button "MENU" to enter the system setup menu, as shown below:



Press the "▲"and "▼" buttons to select a system setup menu. The arrow moves downwards. Press the "OK" button to enter the submenu setup. In the submenu setup, press the "OK" button again to move the cursor arrow rightwards to set alarm point, time delay, and zero point offset. To adjust set values, press the "▲"and "▼" buttons. After the values are set, press the "OK" button to enter the setup of the submenu (and so on and so forth). To cancel the current setup, press the tool button "MENU" and return to the menu on the preceding level.

(2) Time Setup

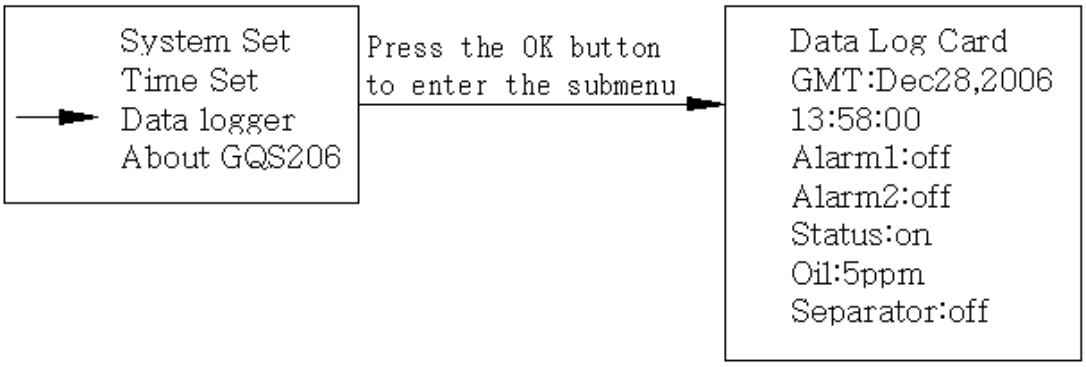
Press the tool button "MENU", and the system will enter the time setup menu.



Press the "OK" button to enter the submenu setup. In the time setup, the user can set year, month, day, hour, minute and second by following the same procedure as the system setup.

(3) Data Logger

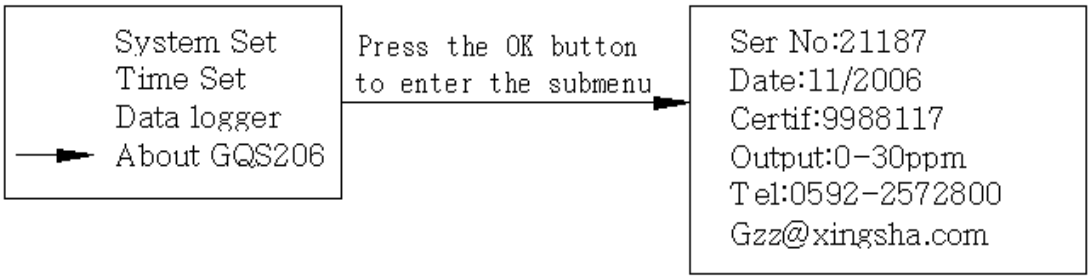
Press the tool button "MENU", and the system will enter the Data Logger menu.



To select data logger menu columns, press the "▲"and "▼" buttons. Press the "OK" button to enter the Data Logger. In the Data Logger, the system shows the operating status of the alarm points, the operating status of the oil water separator, and the off status of the three-way ball valve at the time of fresh water cleaning. The Data Logger provides historic data over the recent 18 months.

(4) About GQS 206

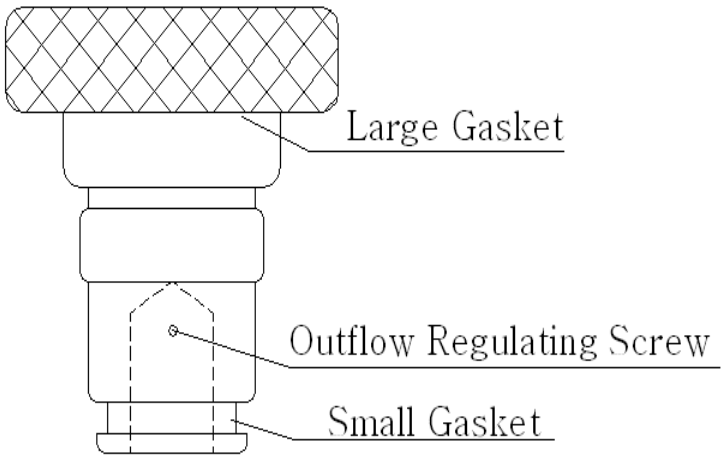
Press the tool button "MENU", and the system will enter the About GQS 206 menu.



After the system enters the About GQS 206 menu, press the "OK" button to read the product information. The About GQS 206 menu provides the manufacturing date, product certificate number, and contact information.

VIII. Maintenance and Servicing

1. If no water sample comes out of the device outlet, the device should be switched off.



The flow regulator is intended to regulate the flow. Turn the regulator clockwise one fourth round, and the water outflow will be reduced correspondingly; likewise, turn the regulator counterclockwise about one fourth round, and the water outflow will be increased correspondingly (do not turn too much counterclockwise; turn no more when no water seepage occurs). There are three outflow orifices at the bottom of the regulator. If the outflow is not as large as desired, remove the screw or seal one or two outflow orifices to regulate the flow (as shown in the above diagram).

2. When the device has been used for about 1,000 hours, check the glass tube in the metering chamber for signs of contamination and perform cleaning when necessary: Open the flow regulating cover on top of the metering chamber and insert the cleaning brush into metering chamber and move it back and forth. Twist off the regulator and feed in fresh water; keep the device running with fresh water for a while, and observe if the device shows "0" to "2" ppm; if not, clean the device again. Remove the cleaning brush, and reinstall the flow regulator.

3. .If the device does not show zero when water is running through it,

zero point adjustment should be performed: Ipress the "MENU" button on the panel to enter the "Off set" submenu; the user may press "the "▲"and "▼" buttons until the device shows "0" ppm.

4.Use and Replacement of Desiccant

Desiccant should be adequate to maintain the humidity of the metering chamber at a level below 40% in order to ensure metering accuracy and protect components inside the metering chamber. Observe the color of the desiccant; if the desiccant is blue, it means that the desiccant device is operating normally; if the desiccant has turned pink, it should be replaced: loosening the sealing screw cap, remove the used desiccant, and put new desiccant in the drying bucket.

IX. Troubleshooting

Problem	***Possible Cause***	***Corrective Action***
LCD inoperative	No power to LCD Fuse burnt Faulty LCD screen	Connect power according to wiring requirements Replace fuse Replace LCD screen
When clean water is running through the device, the device shows an excessively large figure.	The glass tube in the metering chamber has been contaminated The optical-electrical converter has been damaged	Clean the glass tube and perform zero point adjustment Replace the optical-electrical converter
When the device is running and oil content exceeds 15 ppm, alarm light does not flash after delay time	Faulty alarm light Faulty alarm system for connection	Replace alarm light Check alarm system and electric circuit
Oil content reading unstable	Metering room unclean Desiccant expires Oil concentration in metering room not distributed evenly	Clean metering room Replace desiccant Keep device running for some more time
"EE" shown	Metering room unclean Oil content in oily water too high Defective wiring board	Clean metering room and re-zero as required
Alarm inoperative	Improper wiring Faulty relay alarm	Re-wire as required Replace relay
Wrong time reading	Lithium battery dead	Replace lithium battery and enter system "time setup" to adjust clock

Warning: **To prevent the trouble from expanding and accident damage, the device should be serviced only by qualified and competent personnel who have been trained in this area.**

X. Transport and Storage

1. Before packaging and transport, water in the pipeline and metering chamber should be drained. Adequately packaged devices can be transported with general vehicles. Avoid impact, rainwater and sun exposure.
2. The device should be stored at an ambient temperature of 2 to 55°C and a relative humidity of less than 95%. The room where the device is kept should not contain any corrosive gas.

XI. Device Set

(I) One main unit

(II) Accessories

1.	Cleaning Brush	one
2.	Rubber O Ring Φ 32 for Flow Regulator	one
3.	Rubber O Ring Φ 20 for Flow Regulator	one
4.	Fuses (F1:2A F2:1A)	each two
5.	Φ 8 Ball Valves	two
6.	Φ 8 Tee Coupling	one
7.	Φ 8 Singe Ferrule Connectors	four
8.	Φ 8 Double Ferrule Connectors	two
9.	Φ 8 Straight Pipes	two

(III) User's Manual two

(IV) Product Quality Certificate one